

Public Finance

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Chapter 3

Internalizing Externalities

The main goals of this chapter are to:

- explore the concept of externalities and its divisions.
- explore the effect of externalities on efficiency.
- analyze how to overcome the effect of externalities on efficiency.





The Concept of Externalities

- Externalities are costs or benefits of market transactions not reflected in prices.
- When an externality prevails, a third party (other than buyers of an item) is affected by its production or consumption
- Market prices do not reflect either all the MSB or all the MSC of traded items when an externality is involved





Divisions of Externalities

- **Negative Externalities:** They are called external costs which are costs to third parties other than the buyers or the sellers of an item not reflected in the market price, For example: pollution.
- **Positive Externalities:** They are benefits to third parties other than the buyers or the sellers of a good or service not reflected in prices, For example: the purchase of smoke alarms and vaccination.





Externalities and Efficiency

- Externalities causes problems for resource allocation in a free market system.
- When an externality exists, MPC or MPB that market participants base their decisions on differ from the actual MSC or MSB.





Negative Externalities

- The **marginal external cost (MEC)** is the value of the cost to third parties from the production or consumption of an additional unit of a good.
- **Example:** Driving a car imposes a private cost and external cost.
- The Private cost of the driver (cost of petrol, tax and buying car).
- The external cost of driving a car includes greater congestion, pollution, noise, and health-related problems.





Negative Externalities

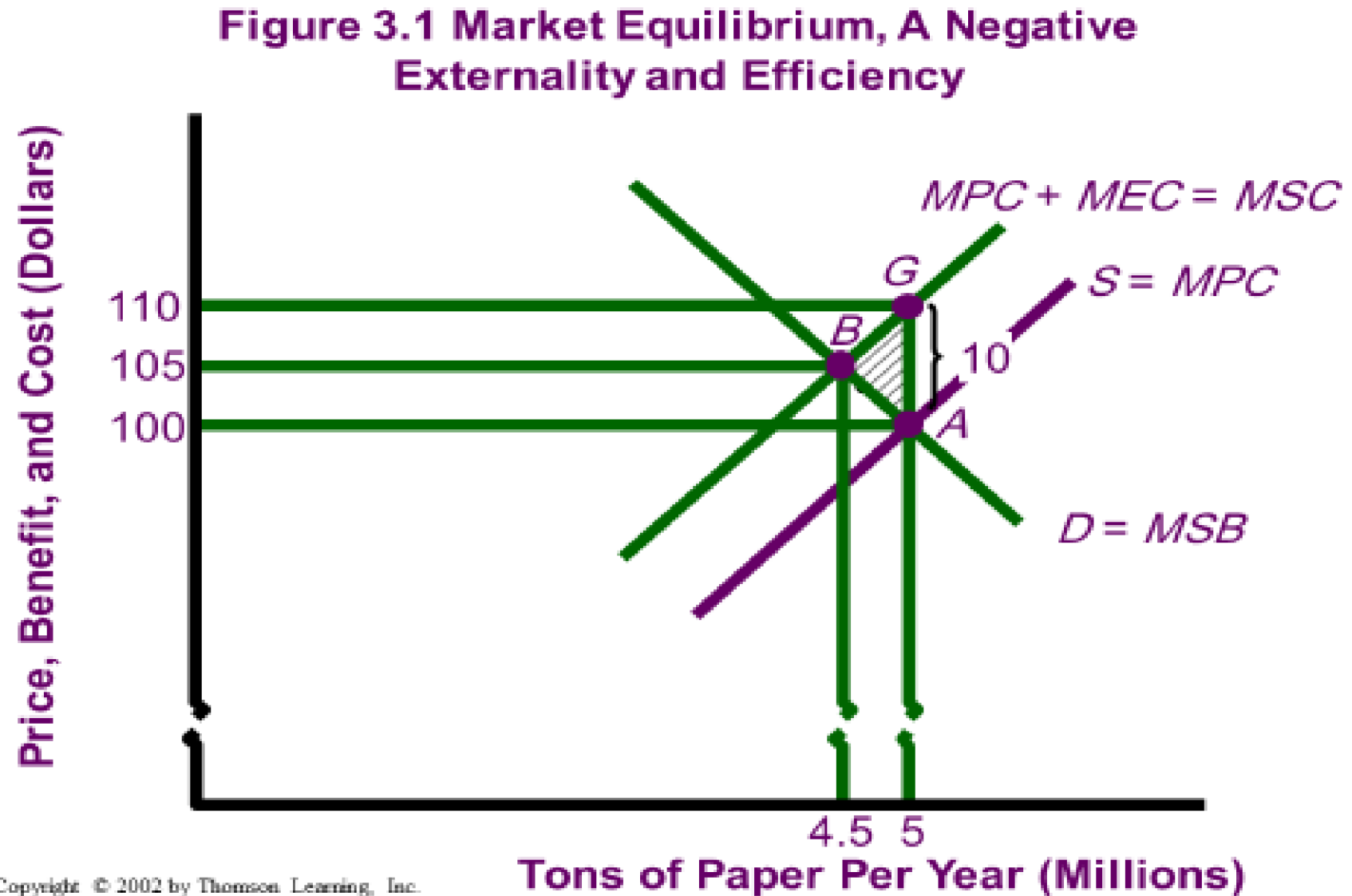
- When a negative externality exists, the price of a good or service just reflects the MPC of that goods and does not reflect the full MSC of resource allocated to its production.

$$\text{MSC} = \text{MPC} + \text{MEC}$$

- The existence of external costs can lead to market failure.
- This is because the free market generally ignores the existence of external costs.



Figure 3.1 Market Equilibrium, A Negative Externality and Efficiency





Implications of Figure 3.1

- the market equilibrium occurs (at point A) at output of 5 million tons per year where:

$$MPC = MSB$$

- But this output level is inefficient because $MSC > MSB$ at that output, where the price is \$100 per ton.
- The efficient output corresponds to point B where:

$$MSC = MPC + MEC = MSB$$





Implications of Figure 3.1

- So, the efficient output of paper is 4.5 million tons per year and the price of paper would have to rise to \$105 per ton.
- This will result in net gain equal to the triangular area BGA.
- **When a negative externality exists, too much output is produced and sold in a competitive market relative to the efficient amount.**





Positive Externalities

- The marginal external benefit (MEB) is the value of the benefit to third parties from an additional unit of production or consumption of a good.
- Clearly when a positive externality exists, the price of a good or service does not reflect the full MSB of resource allocated to its production.





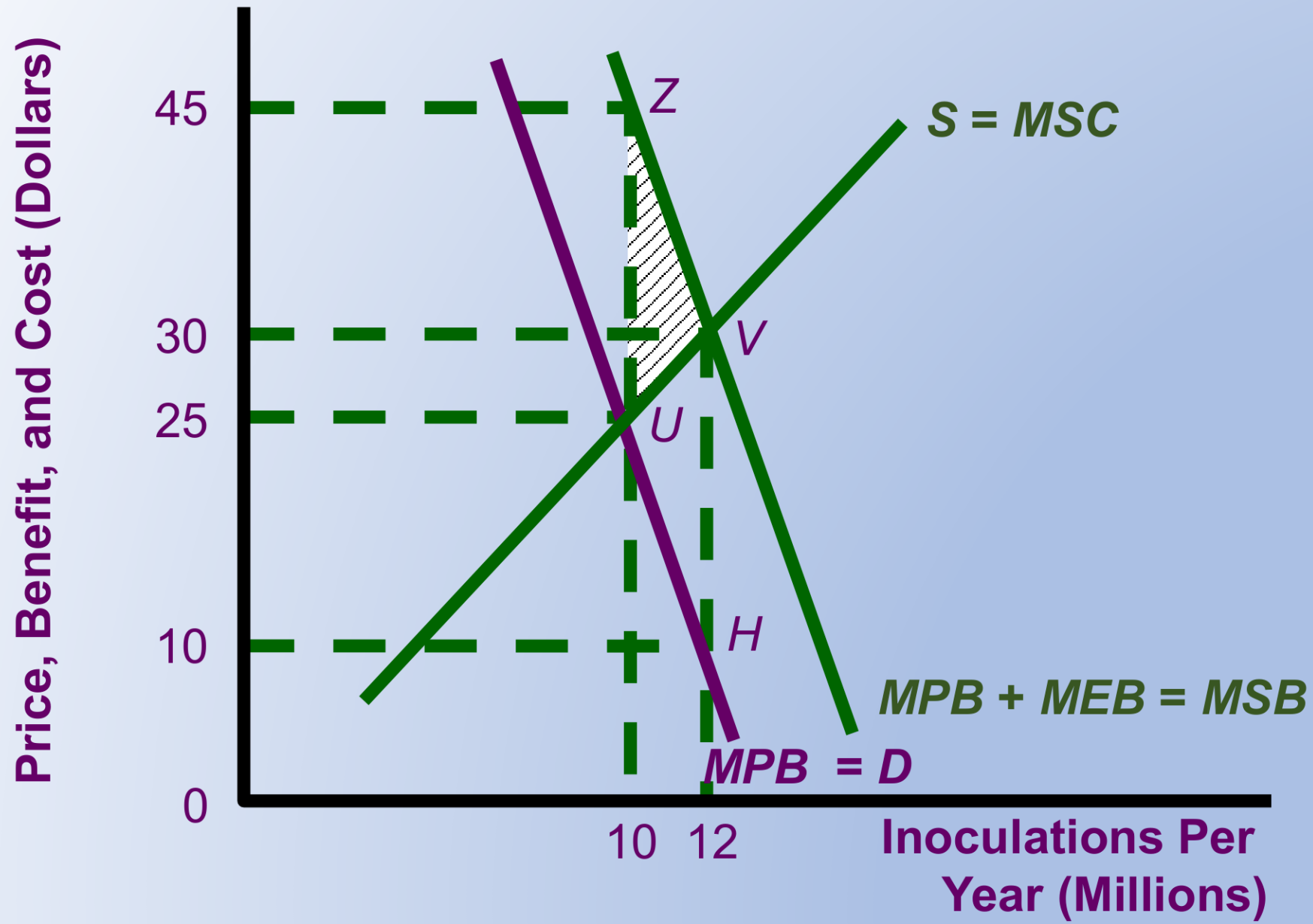
Positive Externalities

- Why do positive externalities lead to a failure of the free-market mechanism?
- This is because the marginal social benefits (MSB) of consuming the good > private marginal benefits (MPB).
- examples of positive externalities are represented in education, healthcare, vaccination.

$$\text{MSB} = \text{MPB} + \text{MEB}$$



Figure 3.2 Market Equilibrium, A Positive Externality and Efficiency





- The market equilibrium occurs (at point U at which $MPB = MSC$) at output of 10 million units.
- But this level of output is inefficient because $MSB > MSC$ at that point, where the price is \$25 per unit.
- The actual MSB when 10 million are purchased per year, is \$45, This equals the sum of the MPB received by consumers and MEB to others of \$20.





- The efficient annual output corresponds to point V, at which 12 million units would be consumed per year because:

$$\text{MPB} + \text{MEB} = \text{MSB} = \text{MSC}$$

- The price to consumers would have to fall from \$25 to \$10 per unit.
- Moving to the efficient point allows net gains equal to the triangular area UZV.





Internalization of Externalities

- An externality can be internalized if there is a policy that causes market participants to account for the costs or benefits of their actions
- This requires a measurement of the monetary value of MEB and MEC.
- Internalization occurs when the MPB or MPC of goods and service are adjusted so that the users consider the actual MSB or MSC of their decisions.





Corrective Taxes to Negative Externalities

- Setting a tax equal to the *MEC* will internalize a negative externality.
- This corrective tax is designed to internalize externality by making sellers of the product pay a fee equal to the MECs per unit.
- The tax sets to be equal MEC ($T = \$10$ per unit) and this affected the supply curve to shift up, where the new curve reflects the full MSC.



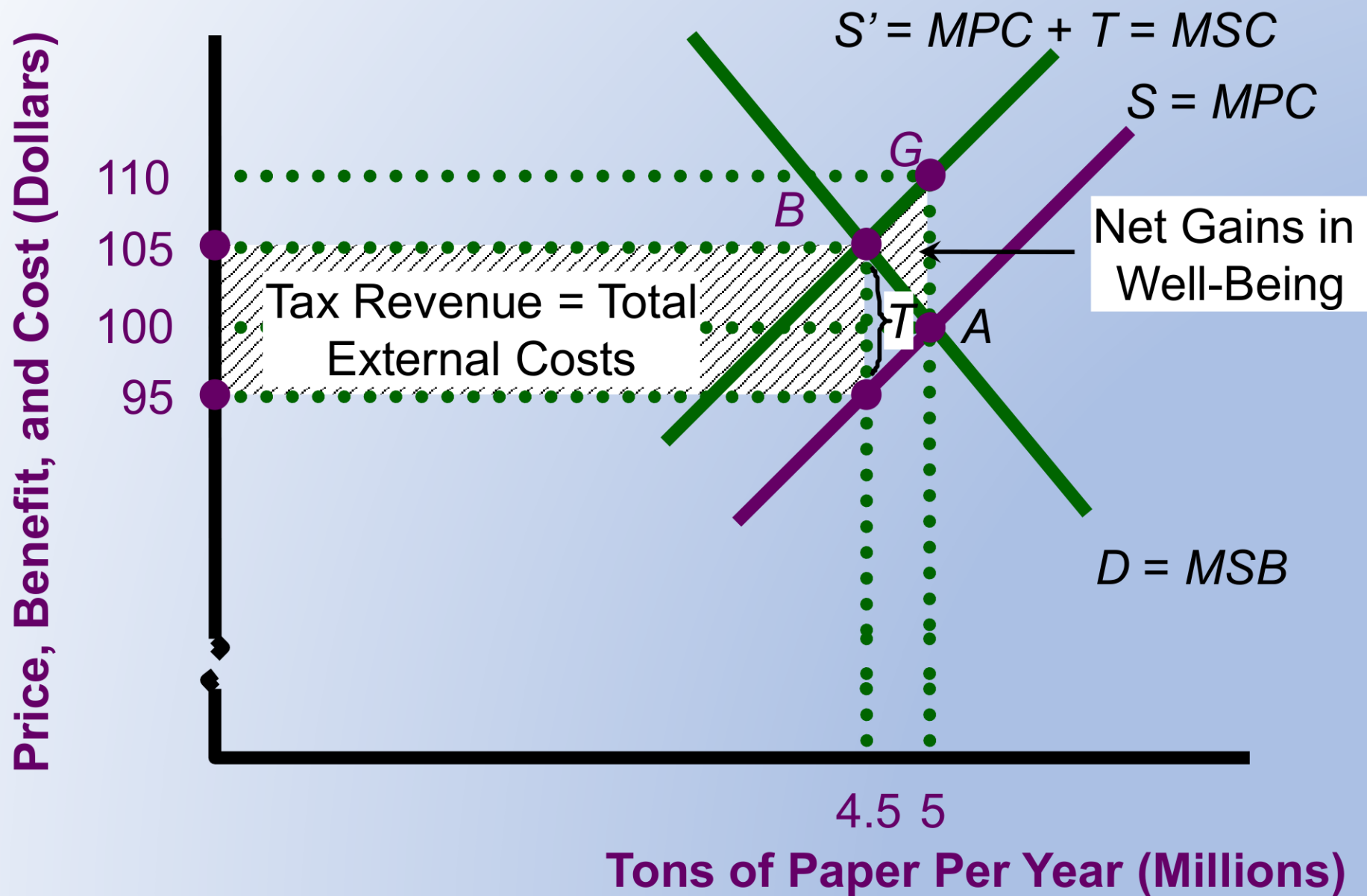


Corrective Taxes to Negative Externalities

- This changes the market equilibrium from A to B and the market price increases to \$105 per ton.
- The equilibrium quantity of paper consumed declines from 5 to 4.5 million tons per year and this is equal to the efficient annual output of paper.
- The tax revenue collected is represented by the area FBJH.
- The tax allows net gains in welfare equal to the area BGA.



Figure 3.4 A Corrective Tax





Internalizing externalities Associated with Goods Sold in Imperfectly Competitive Markets (Monopolistic Power)

- Monopoly creates a loss to society.
- As Figure 3.5 shows, a monopoly producing output Q_m per year, corresponding to point C, at which its $MPC = MR$.
- This output level is inefficient when MPC is also the MSC .
- This would result in a loss of net benefit represented by the area ABC.
- The efficient output would be Q^* , which corresponds to point B.



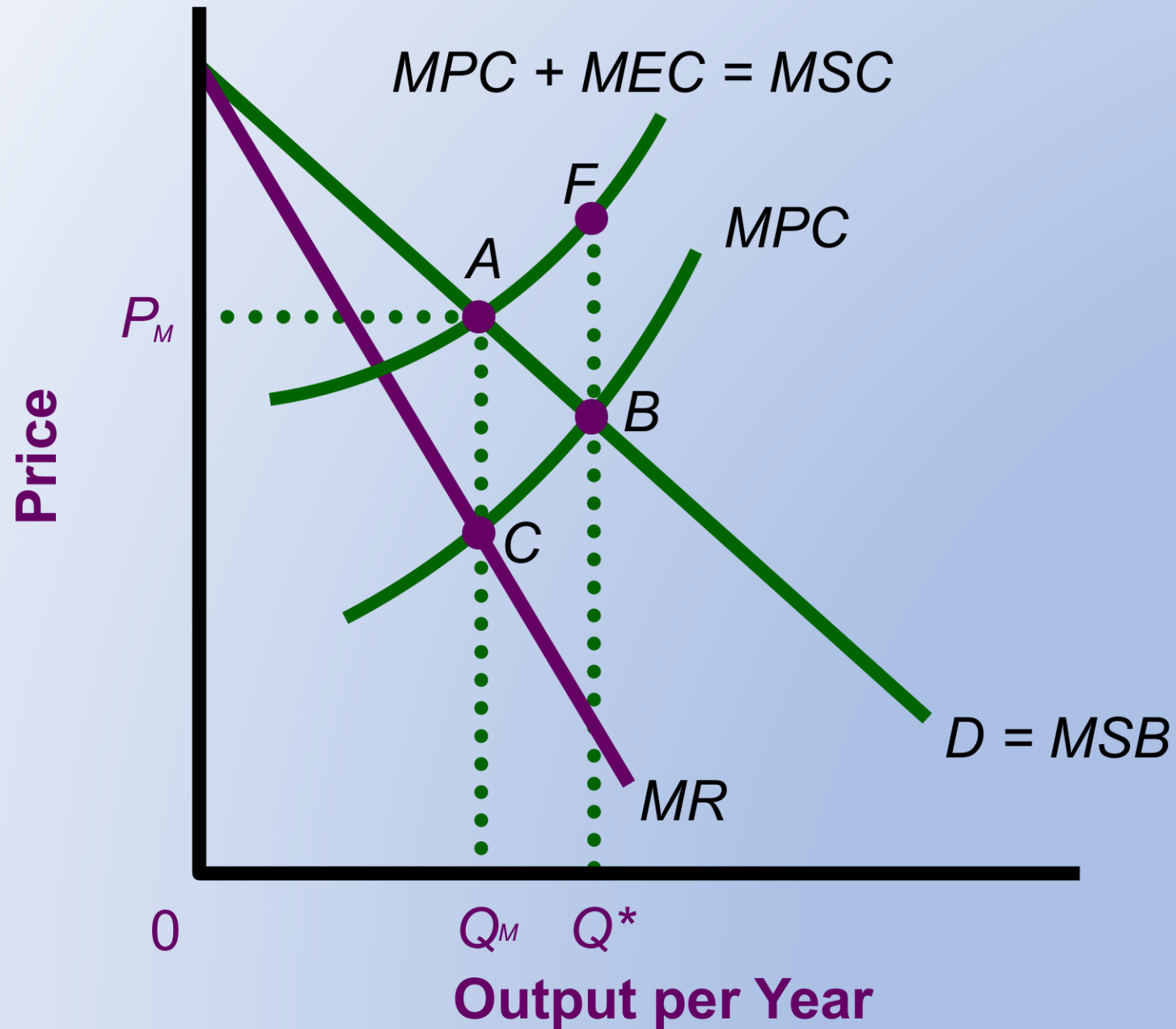


Internalizing externalities Associated with Goods Sold in Imperfectly Competitive Markets (Monopolistic Power)

- When a negative externality is associated with the monopolist's output, MSCs would be $MPC + MEC$ and would exceed MPCs.
- The output Q^* would not be efficient because its MSC would exceed its MSB.
- The efficient output would be Q_m , corresponding to point A, at which $MSC = MSB$.
- The monopolistic output is the efficient output when the externality present.
- The monopolist's power allows net gains in welfare equal to the triangular area AFB.



Figure 3.5 A Second Best Efficient Solution

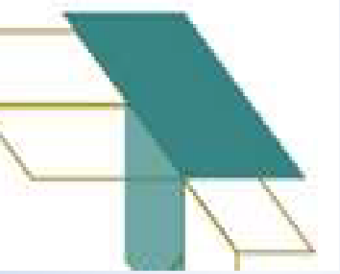




Corrective Subsidies: Internalizing Positive Externalities

- Setting a subsidy equal to MEB will internalize a positive externality.
- Clearly, a corrective subsidy is a payment made by government to either buyers or sellers of a good.
- As Figure 3.6 shows, the subsidy payment must be equal to the MEB (\$20).
- This will add to the MPB of each unit. As a result, the demand curve shifts upward and the market equilibrium moves from point U to point V.
- Here, the market price increases to \$30 to cover increased marginal costs of production.

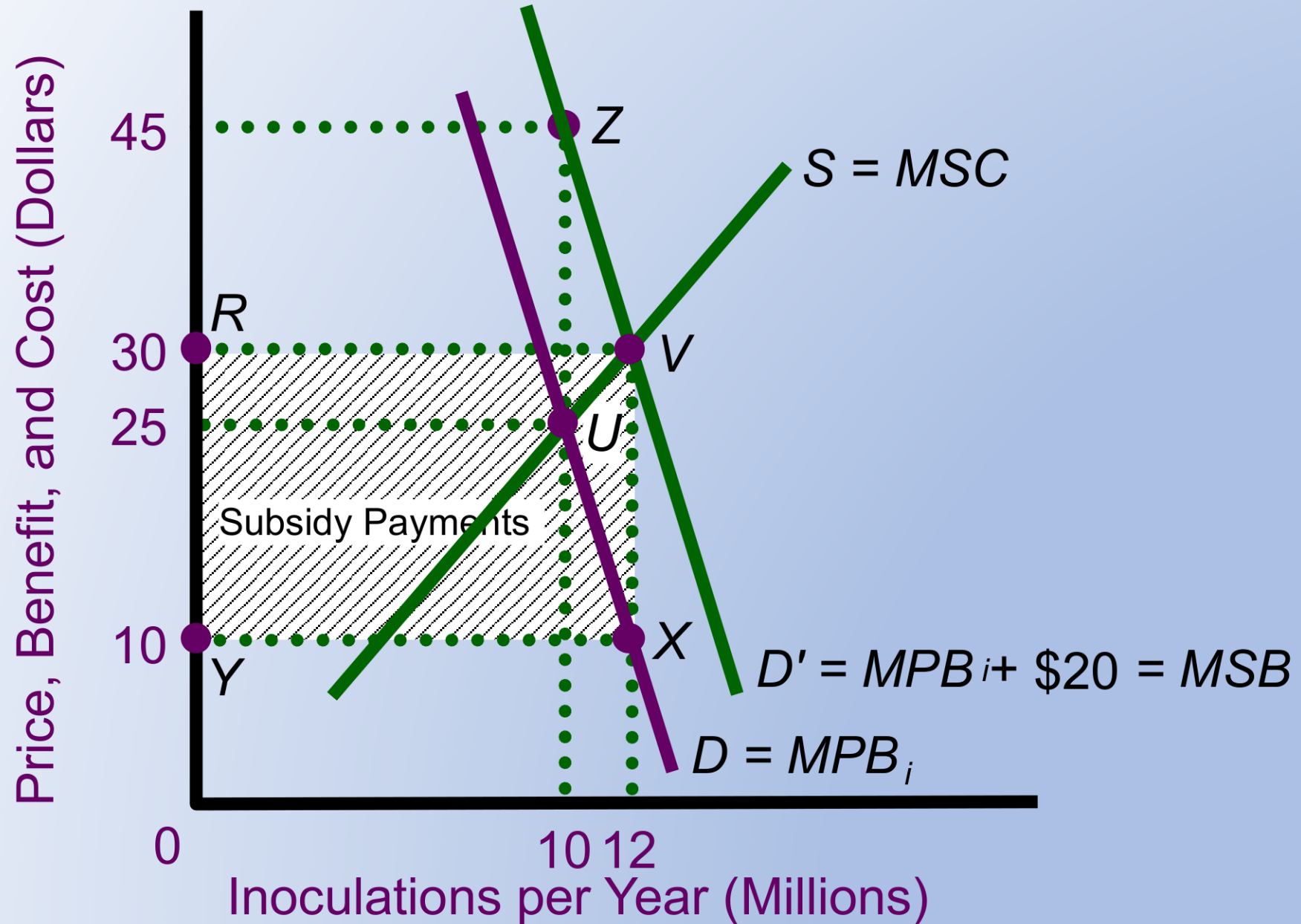




- The net price after receiving the subsidy declines for consumers, which is $\$30 - \$20 = \$10$ per unit.
- This reduction in the net price to consumers increases the quantity demanded to 12 million per year to reach the efficient output.
- Subsidy has increased the benefit to those other than the buyers or the sellers from \$200 million per year to \$240 million ($20 * 12$).
- This is represented by the area RVXY.
- The net gain to society from this subsidy is represented by the area of the triangle UVX.



Figure 3.6 A Corrective Subsidy



Thank You
For good listening

